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Patent Claims

1. A "corvette" vessel-type equipment system having standard equipment segments, such as a power generator segment, a power distribution segment, a propulsion segment and an automation segment, and having a vessel hull (1) which is matched to the "corvette" vessel-type equipment system on a size and requirement-specific basis,
5 characterized in that at least one standard equipment segment, such as the power generator segment and/or the power distribution segment and/or the propulsion segment and/or the automation segment, is formed from standard units or components which are arranged in accordance with the requirements in the vessel hull of the "corvette" vessel-type equipment system, and which
10 can be installed in vessel hulls of different vessel-type equipment systems.
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2. The "corvette" vessel-type equipment system as claimed in claim 1, in which the propulsion segment comprises a combination of a POD propulsion segment (2), which is preferably in the form of a completely electrical lightweight POD propulsion system and preferably has a power of 6 to 8, and preferably 7 MW, and has two waterjet propulsion segments (3, 4), which are preferably in the form of twin waterjet propulsion systems and preferably have a power of 12 to 16, and
25 preferably 14 (2x7), MW.
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3. The "corvette" vessel-type equipment system as claimed in claim 1 or 2, whose propulsion segment includes a thruster segment (5), preferably a 0.3 MW bow jet thruster.
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4. The "corvette" vessel-type equipment system as claimed in claim 2 or 3, in which electric motors in the POD propulsion segment (2) and/or in the waterjet propulsion segment (3, 4) and/or in the thruster segment (5) are designed with windings composed of high-temperature superconductors.

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5. The "corvette" vessel-type equipment system as claimed in claims 2 to 4, in which the electric motors in the POD propulsion segment (2) and/or in the waterjet propulsion segments (3, 4) and/or in the thruster segment (5) are in the form of synchronous machines with a field winding composed of high-temperature superconductors, and with the stator windings being in the form of air-gap windings.

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6. The "corvette" vessel-type equipment system as claimed in claims 2 to 5, whose waterjet propulsion segments (3, 4) are equipped with a coaxial exhaust-gas nozzle segment.

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7. The "corvette" vessel-type equipment system as claimed in claims 2 to 6, in which - in the longitudinal direction - the distance between the center of the POD propulsion segment (2) and the nose of the traction propeller (13) of the POD propulsion segment (2) on the one hand, and the nozzle outlet openings of the pods of the waterjet propulsion segments (3, 4) on the other hand is at least 15 m or 14 m, and is advantageously approximately 20 m or approximately 19 m.

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8. The "corvette" vessel-type equipment system as claimed in claims 2 to 7, whose vessel hull (1) is designed to broaden in the stern area of the vessel from the vessel center, preferably from a width of approximately 15 m at the center of the vessel to a width of approximately 17 m at the stern, so that the weight of the POD propulsion segment (2) of, for example, approximately 65 tonnes and the weight of the associated equipment, such as converters, controllers, etc, of, for example, approximately 10 to 15 tonnes can be absorbed by means of it, with

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the vessel hull (1) having, in the stern area of the vessel, a structure whose strength is sufficient to absorb the axial forces which occur as a result of the operation of the POD propulsion segment (2).

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9. The "corvette" vessel-type equipment system as claimed in claims 1 to 8, in which the power generator segment is formed from a combination of
10 preferably two fuel cell segments (6, 7), preferably in the form of air-breathing PEM

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fuel cells each having a power of approximately 4.5 MW (net) or 6 MW (gross), and/or generator segments (8, 9), preferably two gas-turbine-powered generator, each having a power of 5 approximately 16 MW.

10. The "corvette" vessel-type equipment system as claimed in claim 9, whose generators (8, 9) have windings composed of a high-temperature superconductor.
15. The "corvette" vessel-type equipment system as claimed in claim 9 or 10, whose generators (8, 9) are in the form of synchronous machines with a field winding composed of high-temperature superconductors, with the stator windings being in the form of air-gap windings.
20. The "corvette" vessel-type equipment system as claimed in claims 9 to 11, whose two air-breathing PEM fuel cells (6, 7) are associated, in order to supply them with hydrogen, with a diesel reformer (10) with a power of approximately 9 MW.
25. 13. The "corvette" vessel-type equipment system as claimed in claims 9 to 11, whose two air-breathing PEM fuel cells (6, 7) are associated, in order to supply them with hydrogen, with two diesel reformers, each having a power of approximately 30 4.5 MW.
35. 14. The "corvette" vessel-type equipment system as claimed in claims 1 to 13, whose power generator segment is distributed over a number of ship protection areas SSB-2, SSB-3 and SSB-4 in the "corvette" vessel type equipment system.

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15. The "corvette" vessel-type equipment system as
claimed in claims 9 to 14, in which a first
electrical system with two air-breathing PEM fuel
cells (6, 7) is arranged in a third ship
5 protection area SSB-3 which is arranged between a
bow-end vessel protection area SSB-4 and a vessel
protection area SSB-2 amidships, preferably close
to the

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transition to the midships vessel protection area SSB-2.

16. The "corvette" vessel-type equipment system as
5 claimed in claims 9 to 14, in which a first
electrical system having an air-breathing PEM fuel
cell in a third vessel protection area SSB-3 which
is arranged between a bow-end vessel protection
area SSB-4 and amidships vessel protection area
10 SSB-2, preferably close to the transition to the
midships vessel protection area SSB-2, and a
further electrical system with an air-breathing
PEM fuel cell is arranged in the midships vessel
protection area SSB-2, preferably in its
15 compartment V.
17. The "corvette" vessel-type equipment system as
claimed in claims 9 to 16, in which a second
electrical system having one to four and
20 preferably two, generators (8, 9) and having one
to four, and preferably two, internal combustion
engines, preferably gas turbines (11, 12) by means
of which the generators (8, 9) can be driven, is
arranged in amidships vessel protection area SSB-
25 2.
18. The "corvette" vessel-type equipment system as
claimed in claim 17, in which the gas turbines
(11, 12) and the generators (8, 9) for the second
30 electrical system are arranged in adjacent
compartments VI, VII in the midships vessel
protection area SSB-2.
19. The "corvette" vessel-type equipment system as
35 claimed in claims 9 to 18, in which a diesel
reformer center with a diesel reformer (10) is
arranged in the bow-end vessel protection area

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SSB-4, preferably close to the transition to the third vessel protection area SSB-3.

20. The "corvette" vessel-type equipment system as
5 claimed in claims 9 to 18, in which a diesel reformer center with

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a diesel reformer is arranged in the midships vessel protection area SSB-2, preferably in the compartment VI.

5 21. The "corvette" vessel-type equipment system as
claimed in claims 9 to 18, in which a first diesel
reformer center with a diesel reformer (10) is
arranged in the bow-end vessel protection area
SSB-4, preferably close to the transition to the
third vessel protection area SSB-3, and a second
diesel reformer center with a diesel reformer is
arranged in the midships vessel protection area
SSB-2, preferably in the compartment VI.

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15 22. The "corvette" vessel-type equipment system as
claimed in claims 9 to 18, in which a first diesel
reformer center with a diesel reformer is arranged
in the midships vessel protection area SSB-2,
preferably close to the further electrical system
with an air-breathing PEM fuel cell in the
compartment V, and a second diesel reformer center
with a diesel reformer is arranged in the third
vessel protection area SSB-3, preferably close to
the first electrical system, with an air-breathing
fuel cell close to the transition to the midships
vessel protection area SSB-2.

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25 23. The "corvette" vessel-type equipment system as
claimed in claims 18 to 22, in which double-walled
bulk heads are arranged between the adjacent
compartments VI, VII with the gas turbines (11,
12) and the generators (8, 9) of the second
electrical system in the midships vessel
protection area SSB-2.

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35 24. The "corvette" vessel-type equipment system as
claimed in claims 18 to 23, in which the gas

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turbines (11, 12) in the compartment VI and the generators (8, 9) in the compartment VII for the second electrical system are each separated from one another by a central longitudinal bulk head in the midships vessel protection area SSB-2.

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25. The "corvette" vessel-type equipment system as
claimed in claims 2 to 24, whose POD propulsion
system (2) is designed for the "corvette" vessel-
type equipment system to travel at a continuous
5 cruise speed of, for example, approximately 12 to
14 knots, and can be supplied with electrical
power in this operating state by means of two fuel
cell segments (6, 7).

10 26. The "corvette" vessel-type equipment system as
claimed in claims 2 to 25, whose waterjet
propulsion segments (3, 4) are designed for the
"corvette" vessel-type equipment system to travel
at a top speed of, for example, approximately
15 30 knots, and can be supplied with electrical
power in this operating state by means of the two
gas-turbine-powered generators (8, 9).

20 27. The "corvette" vessel-type equipment system as
claimed in claims 2 to 26, whose waterjet
propulsion segments (3, 4) can be supplied with
electrical power from at least one of the fuel
cell segments (6, 7) until the power limit of the
fuel cell segment or segments (6, 7) is reached in
25 order to start up these waterjet propulsion
segments (3, 4) with low emissions.

30 28. The "corvette" vessel-type equipment system as
claimed in claims 2 to 27, which achieves speeds
of more than 35 knots by operating its POD
propulsion system (2) and its waterjet propulsion
segments (3, 4) simultaneously, in which case the
distribution of the electrical power which is
produced by means of the power generator segment
35 can be achieved with optimized efficiency by means
of the power distribution segment and energy
management for an automation carrier system

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vessel (29).

29. The "corvette" vessel-type equipment system as
claimed in claims 2 to 28, whose power
5 distribution segment is a propulsion network (14,
15) which is fed from fuel cells and by means of
which the POD propulsion segment (2) can be
supplied with electrical power, and has a
generator-fed propulsion network (17), by means of
10 which the waterjet propulsion segments (3, 4) can
be supplied with electrical power.

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30. The "corvette" vessel-type equipment system as claimed in claim 29, in which the propulsion network (14, 15) which is fed from fuel cells has a stern-end network section (14) which is essentially associated with the stern-end vessel protection area SSB-1, and has a bow-end network section (15) which is essentially associated with the third vessel protection area SSB-3 and can be connected to the stern-end network section (14) via suitable coupling elements (16).
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31. The "corvette" vessel-type equipment system as claimed in claim 29 or 30, in which the generator-fed propulsion network (17) is essentially associated with the midships vessel protection area SSB-2 and can be connected to the propulsion network (14, 15), which is fed by means of fuel cells, by means of suitable coupling elements (18, 19).
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32. The "corvette" vessel-type equipment system as claimed in claim 30 or 31, in which an auxiliary propulsion system (20), which is arranged in the bow-end vessel protection area SSB-4, can be supplied with electrical power by means of the bow-end network section (15) of the propulsion network (14, 15) which is fed by means of fuel cells.
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33. The "corvette" vessel-type equipment system as claimed in claims 29 to 32, in which on-board network loads, for example weapon system units (21, 22), can be supplied with electrical power from the entire power generation segment, advantageously by means of the propulsion network (14, 15) which is fed by means of fuel cells.
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34. The "corvette" vessel-type equipment system as
claimed in claims 29 to 33, having low-voltage
electrical systems (23, 24), which are arranged in
various vessel protection areas SSB-1, SSB-3 can
be connected to both propulsion networks (14, 15;
17) and can be connected to one another by means
of suitable coupling elements (25).
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35. The "corvette" vessel-type equipment system as claimed in claims 1 to 34, whose automation segment (29) includes an automation center (30) which has a large number of terminals (32) and a terminal bus (31), and has two or more servers (33), which are connected to the terminal bus (31) and to a system bus (34), and to which control networks (35, 36, 37) which are associated with different vessel protection areas SSB-1, SSB-2, SSB-3 and SSB-4 are connected.

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36. The "corvette" vessel-type equipment system as claimed in claim 35, having a first control network (35), which is essentially associated with the stern-end vessel protection area SSB-1 and with which the POD propulsion segment (2) and the vessel operating engineering (38), which is provided in the stern-end vessel protection area SSB-1, are associated.

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37. The "corvette" vessel-type equipment system as claimed in claim 35 or 36, having a second control network (36), which is essentially associated with the midships vessel protection area SSB-2 and with which the two gas-turbine-powered generators (8, 9), the two waterjet propulsion segments (3, 4) and the vessel operating engineering (39), which is provided in the midships vessel protection area SSB-2, are associated.

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38. The "corvette" vessel-type equipment system as claimed in claims 35 to 37, having a third control network (37), which is essentially associated with the third vessel protection area SSB-3 and the bow-end vessel protection area SSB-4 and with which the two fuel cell segments (6, 7), the diesel reformer (10), the thruster segment (5) and

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the vessel operating engineering (4) which is provided in the third vessel protection area SSB-3 and in the bow-end vessel protection area SSB-4 are associated.